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Visual attention to advertising: The impact of motivation and repetition¹

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SOM theme B: Marketing and Networks

Abstract

Using eye-tracking data, we examine the impact of motivation and repetition on visual attention to advertisements differing in argument quality. Our analyses indicate that repetition leads to an overall decrease in the amount of attention. However, while at first high motivation subjects attend to the ad for a longer time than low motivation subjects, this effect of motivation disappears after two exposures. More specifically, our results suggest that the second exposure counts most. In contrast, the order in which the ad elements are attended to is unaffected by repetition and motivation. Yet, the number of ad elements that are skipped becomes larger as the number of exposures increases. Implications of our results for theories of advertising repetition are formulated.

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1. Introduction

In 1972, Britt, Adams, and Miller demonstrated that consumers were, on average, exposed to between 300 and 600 advertisements per day, which made it impossible for them to attend to all those ads. As competition for the limited attention of consumers is even more a key issue in today's crowded markets and media, it is important to understand how and when consumers devote attention to commercial stimuli, and what determines their attentional strategies. However, "... despite the tremendous amount of money spent on buying consumer attention, little to no research is done on consumer attention" (Janiszewski and Bickart 1994, p. 329). Instead, with some exceptions (e.g., Celsi and Olson 1988; Janiszewski 1993; MacKenzie 1986; Moore, Hausknecht, and Thamodaran 1986; Morrison and Dainoff 1972), the main focus of consumer research has been on information processing and on the effects of advertising on attitude change. In such research, relevant characteristics of the stimuli are considered to be (the quality of) arguments and cues. Arguments and cues are defined in ways that implicitly assume that some level of information processing has already taken place, because the receiver must combine physical characteristics of the stimuli and comprehend their meaning to know whether these characteristics are arguments or cues.

To date, little is known about processes of attention, in particular of visual attention to advertising. We agree with Van der Heijden (1992) that theories of visual attention should take into account both a bottom-up, world-driven approach and a top-down, subject-driven approach by acknowledging exogenous as well as endogenous factors impacting on visual attention. In this study, we examine the impact of an important endogenous factor, consumers' motivation to process information, and an important exogenous factor, the opportunity to process information, as represented by advertising repetition. More specifically, we examine the effects of motivation and repetition on visual attention to advertisements that contain either strong or weak arguments. Visual attention is measured by recording subjects' eye movements. We focus on the amount of attention that is paid to the elements within the ad, and on the order in which the elements are attended to.

2. Conceptual background

Visual attention is generally conceptualized as “... a brain operation producing a localized priority in information processing – an attentional ‘window’ or ‘spotlight’ that locally improves the speed and reduces the threshold for processing events” (Deubel and Schneider 1993, p. 575). Eye movements are commonly treated as an operational definition of visual attention. Although there is not a complete one-to-one correspondence between eye position and attention (Van der Heijden 1992), it is generally assumed that “where the eyes go, so goes attention” (Christianson et al. 1991, p. 699).

Generally, people search stimuli for meaning and not for specific targets (Gould 1976). Kahneman (1973) argued that in free-viewing or undirected attention tasks, in which they control the time they spend attending to a series of pictures, subjects who are given no specific instructions behave similarly to those instructed to linger on “interesting” stimuli, and quite differently from those who follow a “pleasingness” set. This suggests that the eyes tend to be guided to areas which are “... ecologically likely to be most informative” (Kahneman 1973, p. 56). Mackworth and Morandi (1967) found that informative areas are identified very early in the observations.

Cognitive theories of persuasion provide indications of the effects of motivation, repetition, and argument quality on attention. Here it is important to distinguish (a) attention to physical characteristics of the elements of an advertisement, such as the location, the size and the mode, text or pictorial, of the elements, from (b) comprehension and interpretation of the content of the elements, i.e., the content perceived as arguments or as cues. In research, it is frequently assumed (e.g., Petty, Cacioppo, and Schumann 1983) that arguments are part of the textual elements of the ad, while cues reside in the pictorials. Miniard et al. (1991) showed, however, that product-relevant pictures are more likely to be perceived as arguments than as cues, whereas pictures devoid of product relevant information are perceived as cues. In our study, we specifically investigate the visual attention of subjects for pictures and text, under different levels of argument quality (high vs. low).

Several studies have examined the effects of repeated exposure to an advertisement on the number of cognitive responses elicited as well as on the attitudes formed (e.g., Calder and Sternthal 1980; Haugtvedt et al. 1994). Most results support some variant of the two-factor theory (e.g., Cacioppo and Petty 1985; Calder and Sternthal 1980). According to the theory, repeated presentations of a message provide recipients with a greater opportunity to consider the implications of the content of the message in a relatively objective manner and to realize their favorable implications at first. Once a consumer has considered the implications of the message, however, tedium and/or reactance are elicited by the excessive exposure, which results in more counterarguing. The two-factor theory was developed to account for the results of repeated exposure under conditions of external pacing, where consumers do not control the exposure duration themselves. However, in real life, consumers often do control the exposure duration, such as when they are confronted with magazine or newspaper ads. In such situations, it is not obvious what the effect of repeated exposures to the ad will be. A likely overall effect is that learning about the ad will lead to a decrease in the time consumers attend to each subsequent exposure of the advertisement. Furthermore, across exposures a larger reduction in exposure time is likely to occur for low motivation consumers than for high motivation consumers, because the latter consumers are more motivated to attend intensively to all ad elements as soon as possible. In summary,

H1a : Duration of visual attention to an ad decreases under repeated exposures, irrespective of consumers' motivation and argument quality.

H1b : Across repeated exposures, duration of visual attention to an ad decreases more rapidly for low motivation consumers than for high motivation consumers, irrespective of argument quality.

Research further shows that high motivation consumers devote more attention to an ad, and that a larger part of their attention is devoted to ad elements containing arguments (Celsi and Olson 1988). However, it is not known whether strong arguments attract more or less attention than weak arguments. It might well be that the amount of time devoted to strong vs. weak arguments is the same, but that only the content and intensity of the ensuing information processing differs. On the

other hand, it might be that weak arguments receive less attention than strong arguments. Research indicates that under conditions of low involvement, some 65% of the total fixation time is devoted to pictures, because they lead to higher activation and are cognitively less taxing to process than text (Kroeber-Riel 1993).

In addition, since opportunity to attend and, hence, elaboration likelihood increases as the number of exposures increases, differences between high and low motivation conditions are likely to disappear under repeated exposure. Based on this analysis, we offer the following hypotheses:

H2a : Under high motivation conditions, a larger portion of the exposure time is devoted to the textual elements of an advertisement, whereas under low motivation conditions a larger portion is devoted to the pictorial elements, irrespective of argument quality.

H2b : Differences in the distribution of visual attention across ad elements between high and low motivation conditions disappear as the number of exposures increases.

Two different patterns of visual attention for specific ad elements across repeated exposures are conceivable. First, it might be that during the first exposure(s), consumers have insufficient opportunity to attend to all the elements of the ad. If this happens, they may attend to the “missed” elements during subsequent exposures. This could be called the sequential attention effect of repeated exposures as elements are attended to one-by-one (Loftus 1983). Second, it might also be that during the first exposure(s) consumers attend to all elements of the ad in a global manner to obtain an overall impression of its informative value, and that they use subsequent exposures to attend more intensively to the elements until some level of sufficiency is met. This could be called the hierarchical attention effect as subsequent exposures stimulate “deeper” levels of engagement in the ad (Craig and Lockhart 1972). In real life, a combination of both processes is likely to occur depending on factors such as the control consumers have over the exposure, the duration of the exposure, the complexity and novelty of the ad, the motivation of the consumers, and so forth (Cacioppo and Petty 1985). Increasing familiarity with the advertisement need not only lead to decreasing amounts of time consumers attend to message

elements (H1a), but may ultimately lead to consumers skipping ad elements altogether, because a glimpse of some elements makes them realize that they already know the content of the other elements. Hence, we expect that when consumers control their exposure to advertising, the sequential effect of repetition will prevail; or,

H3: The number of ad elements attended to decreases across exposures, irrespective of consumers' motivation and argument quality.

Regarding the specific order in which ad elements are attended to, a rule of thumb in advertising is that the top-left corner is the probable entry point for visual attention and has the highest communication value, while the bottom-right corner has the lowest communication value (Janiszewski 1990). The dominant architecture for print ads is to have a headline on the top, a pictorial in the middle, and text below, with a packshot in the bottom-right corner. In view of the research showing that consumers have schemas about marketing and advertising tactics that are used (Friestad and Wright 1994; Kirmani 1990), it is likely, although research is scarce (cf. Gould 1976), that consumers have ideas about the dominant architecture of advertising as well. Since we use ads that have this dominant architecture, we expect consumers to attend first to the headline, then to the pictorial followed by the text, and finally to the packshot, and we expect this order to be constant across exposures, motivational conditions, and argument quality. Besides, we do not expect that skipping of ad elements affects the order in which the remaining elements are attended to.

H4: The order in which ad elements are attended to remains constant across exposures, irrespective of consumers' motivation and argument quality, and the order is: headline followed by pictorial followed by text followed by packshot.

3. Method

Subjects.

Forty-eight female and twenty male consumers ranging in age from 19 to 52 years were invited to participate in a study by a market research company. The study lasted approximately half an hour, and subjects were paid the equivalent of twenty dollars for their participation.

Design.

An $2 \times 2 \times 3$ (motivation \times argument quality \times repetition) design was used, with motivation and argument quality as between-subjects factors and repetition as a within-subjects factor. A strong and a weak version of an advertisement for an unknown brand of shampoo, Aquavital, were specially designed by an advertising agency. Both versions contained a headline (10% of the ad's size), a pictorial (37%), a packshot (9.5%), and five arguments in favor of the product (11%). The strong version listed five strong arguments; e.g., "The sea extracts in Aquavital provide natural materials that are essential to the strength and the vitality of your hair." An example of the five arguments that were used in the weak version of the ad is "It is suited to everyone's hair." The arguments were selected on the basis of the results of a pilot study, in which ten subjects evaluated a list of arguments on their believability, comprehensibility, originality, and strength. The headline was adjusted to the type of arguments that was used and the combination of headline and arguments was tested on its persuasive force.

To manipulate subjects' motivation to process the Aquavital ad, a procedure was followed that is similar to the procedure used by Petty, Cacioppo, and Schumann (1983). Subjects in the high motivation condition were instructed to watch all ads carefully. They were explained that the study's purpose was to gain insight into the way information is used to form judgments about the products advertised. In addition, subjects in the high motivation condition were promised a choice of shampoo from several brands at the end of the session. Subjects in the low motivation condition were told that the study's purpose was to develop a new method for testing "draft versions" of ads. They were instructed to evaluate the ads themselves.

All subjects were exposed to the Aquavital ad three times. The target ads were embedded in a sequence of thirteen ads, which promoted eight different products: shampoo (shown three times), soup (three times), rice (twice), salad-dressing, sunburn lotion, sports shoes, garden furniture, and a vacuum cleaner. The Aquavital ads were in the second, the fourth, and the ninth position of the sequence. In this paper, only results with respect to the Aquavital ads are presented.

Procedure.

Upon entering the experimental room, subjects received a booklet containing the instructions regarding the experiment. They were informed that their eye movements would be recorded while they were attending to slides of “draft versions” of ads. In addition, the purpose of the study was explained. After subjects finished reading, the instructions were verbally provided once more. Next, subjects were seated in front of a screen, on which the slides were projected from the back, and were instructed to place their chin on a small chinrest. Eye movements were recorded by an infrared camera located at the subjects' left side, such as not to interfere with the subjects' normal viewing behavior. The camera was trained on the subjects' right eye. Eye positions (fovea) were recorded fifty times a second.

Before the slides with the ads were shown, subjects were instructed to press a button in front of them to go through the ads at their own pace. Ads were shown to the subjects for twenty seconds at most. After attending to the ads, subjects performed a calibration task. Next, they completed a questionnaire containing questions about their motivation to process the ad, and their evaluation of the quality of the arguments in the ad.

Measures.

Motivation to process the ad was measured in two separate ways. First, subjects were asked to rate on a seven-point scale (completely agree–completely disagree) their motivation to evaluate the arguments listed in the ad. Second, involvement in shampoo was measured using the following six items (seven-points, strongly agree–strongly disagree) of the Consumer Involvement Profile (Kapferer and Laurent 1985): (1) “When you purchase a brand of shampoo, it's not a big deal if

you make a mistake,” (2) “It is really annoying to purchase a shampoo that is not suitable,” (3) “A poor choice of shampoo would be upsetting,” (4) “I am indifferent to the shampoo I use,” (5) “I attach a great importance to shampoo,” and (6) “I have a strong interest in shampoo.” Scores on the six items were averaged (coefficient alpha = 0.76).

Evaluation of argument quality was assessed by having subjects rate the arguments on three seven-point items anchored by very convincing–not at all convincing, very weak–very strong, and not at all believable–very believable (coefficient alpha = 0.91). Scores on the three items were averaged.

4. Results

Manipulation checks.

Evaluation of argument quality is compared for the two argument conditions using ANOVA. As expected, strong arguments are perceived to be stronger than weak arguments, whereas evaluations by high vs. low motivation subjects do not differ (see Table 1, first row).

ANOVAs further indicate that manipulations of motivation was successful as well. The level of motivation significantly influences both motivation to evaluate arguments and involvement, with high motivation subjects having higher scores than low motivation subjects (Table 1).

Table 1
Results of the manipulation checks

Measures	Low motivation		High motivation		ANOVA ¹ ($F_{1,64}$ -values)		
	Weak	Strong	Weak	Strong	M	A	M×A
Argument quality	-0.18	0.69	-0.46	0.48	0.57	7.56 ^b	0.02
Motivation to evaluate	-0.47	-1.07	0.36	-0.50	4.04 ^a	2.27	0.20
Involvement	0.99	1.80	1.81	2.01	4.86 ^a	4.67 ^a	1.67

¹ M = Motivation; A = Argument quality.

^a $p < 0.10$

^b $p < 0.05$

Tests of hypotheses.

Since the reliability of eye-tracking data may suffer from factors such as blinking of the eye and tearfluid in the eye, several checks were conducted which indicate that for sixteen subjects the reliability of the data was too low to use them in further analysis. These subjects were divided equally between the four between-subjects conditions. The remaining 52 subjects are divided between the four conditions in the following way: 23 subjects belong to the high motivation group, twelve were exposed to strong and eleven to weak arguments; 29 belong to the low motivation group, fifteen were exposed to strong and fourteen to weak arguments. For each subject, the eye-tracking data were transformed into variables representing (1) the total time subjects attended to each ad element and to the total ad (i.e., gaze duration); and (2) the exact moment subjects attended to an ad element for the first time (from the start of a particular exposure).

Multivariate analysis of variance (MANOVA) with repeated measures indicates that hypothesis 1a is supported (Table 2, fifth and eighth row, fourth column); i.e., overall gaze duration decreases significantly from the first to the second as well as from the second to the third exposure (see Table 3).

Table 2
MANOVAs for total gaze duration and proportion of total gaze duration
per ad element within and between exposures

	Between-subjects effects ($F_{1,48}$) ¹			Within-subjects effects ($F_{2,96}$ and $F_{1,48}$) ²			
	M	A	M×A	R	R×M	R×A	R×M×A
Headline	0.81	0.35	0.00	2.56 ^a	0.09	0.51	0.63
Pictorial	5.41 ^b	0.00	2.11	5.00 ^c	2.27	1.05	0.46
Text	2.72	0.37	1.39	13.95 ^c	2.48 ^a	0.08	0.42
Packshot	0.70	3.53 ^a	0.00	5.55 ^c	0.66	0.28	0.02
Overall	4.86 ^b	2.96 ^a	0.00	74.03 ^c	2.27	1.12	0.10
Diff pictorial ³	0.09	0.17	0.91	1.20	4.06 ^b	1.77	0.08
Diff text	0.09	0.05	0.01	0.71	6.04 ^b	0.14	1.03
Diff overall	1.23	0.90	0.11	3.32 ^a	1.37	0.90	0.09
Kendall's tau	0.27	1.41	0.90	2.46	2.08	2.08	0.73

¹ M = Motivation; A = Argument quality; R = Repetition.

² d.f. = 2,96 for the first five rows, and 1,48 for the last four rows.

³ Diff refers to the difference in values between two successive exposures.

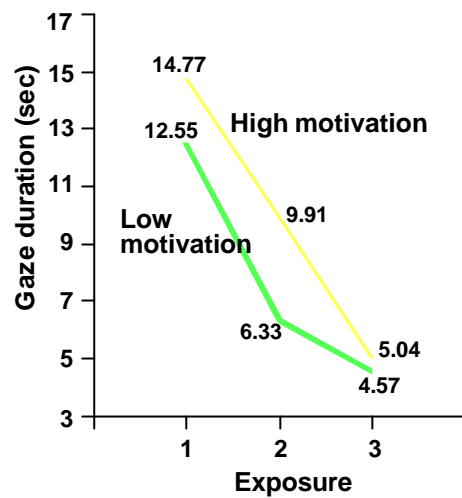
^a $p < 0.10$

^b $p < 0.05$

^c $p < 0.01$

In line with past research, overall gaze duration is longer for high motivation subjects than for low motivation subjects, but this difference only holds for the first and second exposure, and not for the third exposure (Table 3). Figure 1 indicates that the drop in overall gaze duration between the first and second exposure is larger for low than for high motivation subjects, although this difference is not significant (Table 3). From the second to the third exposure, however, overall gaze duration drops significantly stronger for high than for low motivation subjects. Hence, partial support for hypothesis 1b is found. Argument quality, finally, has a marginal effect on overall gaze duration, where only for the second exposure overall gaze duration is longer for ads containing weak rather than strong arguments.

Figure 1
Effect of repeated exposures on gaze duration



With respect to the various ad elements, we find that motivation only affects the proportion of overall gaze duration that is devoted to the pictorial significantly (Table 2). In support for hypothesis 2a, Table 3 reveals that this proportion is larger for low than for high motivation subjects, although the difference is significant for the second exposure only. Since for text elements no differences between levels of motivation are found, hypothesis 2a is not fully supported. However, the significant interaction-effect between repetition and motivation (Table 2) indicates that differences between high and low motivation subjects in the proportion of overall gaze duration devoted to text actually exist, but that these differences are not constant across exposures. In fact, this difference is only significant for the second exposure, during which high motivation subjects devote a larger part of their attention to text than low motivation subjects (Table 3). In short, for low motivation subjects, the part of overall gaze duration devoted to the text decreases and the part devoted to the pictorial increases mainly from the first to the second exposure, whereas the same changes occur for high motivation subjects mainly from the second to the third exposure (see Table 2). Hence, hypothesis 2b is supported; i.e.,

Table 3

ANOVAs for total gaze duration and proportion of total gaze duration

per ad element within and between exposures ¹

	Low motivation		High motivation		ANOVA ($F_{1,48}$) ²		
	Weak	Strong	Weak	Strong	M	A	M×A
Exposure 1							
Headline	19%	15%	18%	21%	0.23	0.01	0.46
Pictorial	16%	14%	8%	13%	2.65	0.06	1.47
Text	49%	55%	57%	49%	0.04	0.00	1.61
Packshot	9%	14%	10%	14%	0.03	4.82 ^b	0.00
Overall	12.61	12.49	15.21	14.37	3.05 ^a	0.12	0.08
Exposure 2							
Headline	22%	23%	20%	22%	0.44	3.27 ^a	1.28
Pictorial	30%	22%	11%	12%	7.03 ^b	0.69	0.64
Text	37%	33%	56%	50%	6.51 ^b	0.38	0.03
Packshot	11%	15%	8%	13%	0.78	1.70	0.04
Overall	7.74	4.82	11.14	8.78	6.79 ^b	3.62 ^a	0.04
Exposure 3							
Headline	23%	23%	28%	29%	0.51	0.00	0.01
Pictorial	25%	20%	12%	22%	1.33	0.17	2.37
Text	26%	31%	38%	27%	0.30	0.09	1.33
Packshot	17%	24%	12%	19%	0.75	1.77	0.00
Overall	5.57	3.49	5.96	4.19	0.21	2.75	0.02
Exp. 2 vs. Exp. 1							
Pictorial	+14%	+8%	+3%	-1%	4.23 ^b	1.18	0.24
Text	-12%	-21%	-1%	+2%	4.63 ^b	0.27	0.57
Overall	-4.87	-7.67	-4.07	-5.59	0.77	1.86	0.15
Kendall's tau ³	0.38	0.31	0.70	0.29	1.35	3.18 ^a	1.79
Exp. 3 vs. Exp. 2							
Pictorial	-5%	-1%	0%	+10%	2.42	1.50	0.43
Text	-11%	-2%	-18%	-23%	3.52 ^a	0.09	0.82
Overall	-2.16	-1.34	-5.18	-4.59	6.75 ^a	0.36	0.01
Kendall's tau	0.29	0.32	0.27	0.25	0.10	0.00	0.03

¹ Proportions do not necessarily sum to 1, because the ad elements as they are defined do not cover the full page.

² M = Motivation; A = Argument quality.

³ Kendall's tau measures the rank correlation between the order in which the ad elements are attended to for the first time during two successive exposures.

^a $p < 0.10$

^b $p < 0.05$

differences in the distribution of visual attention across ad elements disappear as the number of exposures increases, albeit that no differences existed for the first exposure either.

Except for the packshot, no significant effect of argument quality on the distribution of visual attention across ad elements is found (Table 2), which supports hypothesis 2a. Table 3 shows that only during the first exposure a larger part of the visual attention was devoted to the packshot for ads containing strong rather than weak arguments.

Analyses further reveal that the total number of ad elements skipped during the third exposure (54 out of 208 = 52×4) is significantly larger than the number of elements skipped during the first exposure (10; $\chi^2_2 = 24.802$, $p < 0.001$), which supports hypothesis 3. Except for low motivation subjects exposed to weak arguments, the number of elements skipped increases significantly across exposures for all between-subjects conditions.

Finally, the order in which the ad elements are attended to for the first time is the same for most subjects. Subjects first attend to the headline and then to the pictorial, which supports hypothesis 4. Only the ranking of text and packshot show differences due to the fact that these elements are skipped most. Rank correlations of the orders in which the ad elements are attended to during successive exposures (Kendall's tau) all significantly differ from zero, which indicates that this order hardly changes across exposures. ANOVAs reveal no differences due to subjects' motivation, but the consistency in the orders for the first and second exposure is higher for weak than for strong arguments (i.e., Kendall's tau is higher).

5. Discussion and implications

While in past research, effects of advertising characteristics on cognitive responses and attitudes have been studied frequently, only few studies have dealt with the effects on visual attention. In this study, we examined the effects of motivation, argument quality and repetition on two aspects of visual attention, gaze duration and gaze sequence. Overall, the results confirmed our hypotheses, but they also showed that the effects of consumers' motivation and argument quality differ across exposures.

Quite surprisingly, our results support Krugman's (1972) three-exposure hypothesis of the effect of repetition on advertising effectiveness. He argued that the first exposure leads to an identification reaction, since the consumer tries to understand what the stimulus and its content are about. The second exposure leads to an evaluation reaction in which the consumer tries to determine whether the advertised product is important, relevant or new. The third and subsequent exposures then lead to recognition reactions since the consumer realizes that he/she has been exposed to the ad before. Although the three-exposures hypothesis is evidently too simple to account for the effects of repeated exposure to advertising, it does stress the crucial role of the second exposure, as in this exposure consumers actually interact with the ad. In the present study, for the first exposure no differences were found between conditions with respect to the attention devoted to ad elements. In the second exposure, clear, significant differences between high versus low motivation consumers were observed for attention devoted to the pictorial and the text. In the third exposure, these differences disappeared again. The results indicate that during the second exposure, low motivation consumers devote a larger proportion of their time to the pictorial, while the high involvement consumers devote over 50% of their time to the text. The fact that the largest differences in the focus of attention occurred during the second exposure is suggestive of its importance. Although all exposures may play their role in advertising effectiveness, it may be that the "second exposure counts" (SEC). Future research may explore the validity of the SEC effect across exposure situations, advertising stimuli and subjects.

In addition, advertising repetition may have at least two effects on visual attention that mirror results found in decision making (Payne, Bettman, and Johnson 1988), where, under time constraints, consumers have been found to either "filter" (i.e., do different things) or to "accelerate" (i.e., do the same things faster) processing. Of course, applying a time constraint means limiting the opportunity to process, while repetition means increasing the opportunity to process. Hence, it might be that under repeated exposure consumers just pay more attention to all ad elements, without changing the proportion of attention spend to the specific ad elements, which could be called "deepening" and may be seen as the reverse of acceleration. On the other hand, under repeated exposure consumers may also pay attention to different ad elements, which could be called "highlighting" as the reverse

of filtering. If highlighting occurs, the proportion of time spend across exposures changes significantly. Our results revealing changing proportions across exposures and increased skipping of elements are suggestive for a highlighting effect to occur. However, it is not clear whether this effect also occurs when consumers have more stringent time constraints (shorter exposure durations) than was the case in this study.

Finally, although previous research has shown that pictorials may contain (strong) arguments and body texts may contain peripheral cues (Unnava and Burnkrant 1991), and that for such situations the standard ELM predictions are confirmed, it may not always be recommendable to use such an advertisement structure. Our results indicate that, overall, high motivation subjects tend to pay more attention to the text than to the pictorial, whereas low motivation subjects tend to pay more attention to the pictorial than to the text. Since it is assumed that cues are most effective for low motivation consumers, and arguments for high motivation consumers, it may, in general, be more effective to place arguments in the text, and cues in the pictorial.

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